Water Quality Watch

Chesterfield County Resource Protection Area Restoration Guide

CHESTERFIELD COUNTY
1749
VIRGINIA

Chesapeake Bay Preservation Act
Resource Protection Areas

Background

In 1989, the Virginia General Assembly adopted the Chesapeake Bay Preservation Act. The purpose of that law is to "protect and improve the water quality of the Chesapeake Bay, its tributaries, and other state waters by minimizing the effects of human activity upon these waters." In Chesterfield County there are approximately 1,300 miles of perennial and intermittent streams and approximately 95 miles of riverfront along the James and Appomattox rivers. All of these waters are important resources to the citizens of Chesterfield and drain to the Chesapeake Bay. The county adopted a local ordinance to carry out the requirements of the Bay Act in 1991.

A key component of the Chesapeake Bay Preservation Act and its regulations is the identification of "lands adjacent to water bodies with perennial flow that have an intrinsic water quality value due to the ecological and biological processes they perform or are sensitive to impacts that may result in significant degradation to the quality of state waters." Such lands are known as Resource Protection Areas or RPAs. They are also generically referred to as riparian buffers.

If you live near one of these areas that has been left in its natural state, you may notice that there are several layers of vegetation. Typically, an undisturbed RPA contains a dense tree canopy, understory trees, shrubs and leaf or pine litter. Similar to the various parts of an engine, these RPA components serve different functions. The tree canopy reduces the erosive effects of rain; the roots of the vegetation consume or "take up" both nitrogen and phosphorus; the leaf and other vegetative "litter" convert toxic substances contained in lawn care products to a less toxic form; and, finally, tree limbs and other larger vegetative debris serve to obstruct sediment particles from entering the adjacent water body. All of these components work together to significantly reduce the amount of pollutants entering nearby water bodies.

When an RPA is being restored either voluntarily or as directed through an enforcement proceeding, the goal is to come as close as possible to achieving the original function described above.

The Office of Water Quality has produced this manual to serve as a how to guide for the restoration of RPAs. Our mission is to protect, maintain, and restore the chemical, physical and biological integrity of Chesterfield County's waters. This mission furthers one of the county's Strategic Goals: To Be Responsible Protectors of the Environment. For more information, call (804) 748-1035.

*Providing a **FIRST CHOICE** community through excellence in public service*

What are Resource Protection Areas?

The Chesapeake Bay Preservation Act

In 1988 The Virginia General Assembly enacted the **Chesapeake Bay Preservation Act**. The Act requires local governments to include water quality protection measures in their zoning and subdivision ordinances and in their comprehensive plans. In October 1990, Chesterfield County adopted the **Chesapeake Bay Preservation Ordinance** to protect environmentally sensitive lands known as Chesapeake Bay Preservation Areas. The most sensitive of these are called **Resource Protection Areas**.

What are Resource Protection Areas?

Resource Protection Areas (RPAs), or buffers, are the corridors of environmentally sensitive land that lie alongside or near the shorelines of streams, rivers, and other waterways. In their natural condition, RPAs protect water quality. RPAs filter pollutants out of stormwater runoff, reduce the volume of stormwater runoff, prevent erosion, and perform other important biological and ecological functions. The components of an RPA include:

- Tidal wetlands
- Tidal shores
- Non-tidal wetlands connected by surface flow and adjacent to tidal wetlands or tributary streams
- A 100-foot buffer landward of the above features

In Chesterfield County, RPAs are located adjacent to the James and Appomattox rivers, to the Falling Creek, Lake Chesdin and Swift Creek reservoirs, and to the 469 miles of perennial streams (streams that flow all year long) throughout the county. The James and Appomattox rivers are tributaries to the Chesapeake Bay. All of our streams are tributaries to these two rivers.

Why should we protect our waters?

Streams, lakes and rivers are a key ingredient in our quality of life. They support a wide variety of plants, animals and aquatic life. People also enjoy them as visual and recreational resources. In Chesterfield County, a high percentage of homeowners benefit from living near a stream, river or other water body. Chesterfield County is committed to protecting our waters because they are valuable community assets.

What happens if Resource Protection Areas are not properly managed?

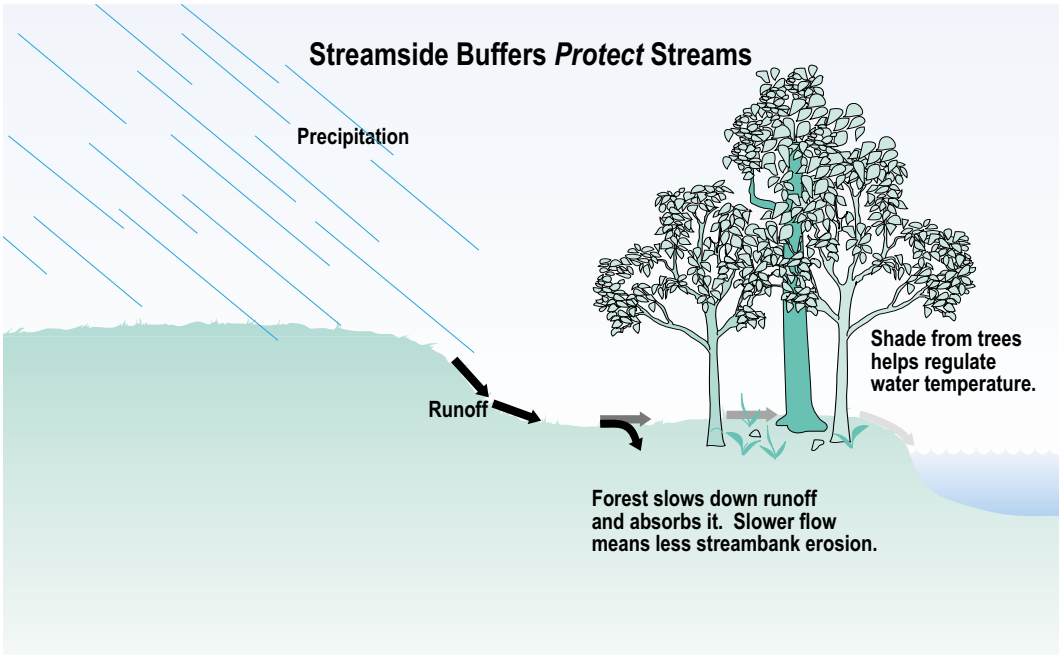
Because RPAs are so close to water bodies, disturbing them allows more pollutants to enter our waters and, eventually, the Chesapeake Bay. Stormwater runoff picks up and carries oil from roads, soil from construction sites, fertilizers and pesticides from farms and lawns, harmful bacteria from pet and farm animal wastes, and trash. In many areas, stormwater is one of the leading causes of surface water pollution. Poorly managed RPAs, or the lack of a protected stream corridors, may result in other impacts such as stream bank and channel erosion, habitat destruction, and a reduction in the stream's biodiversity.

Why are Resource Protection Areas so important?

A naturally vegetated RPA, or buffer, acts as a ***stream protector***, ***filter***, ***transformer***, ***nutrient sink*** and a ***food source***. These critical functions enable the RPA to remove pollutants from stormwater runoff and protect the stream or other water body.

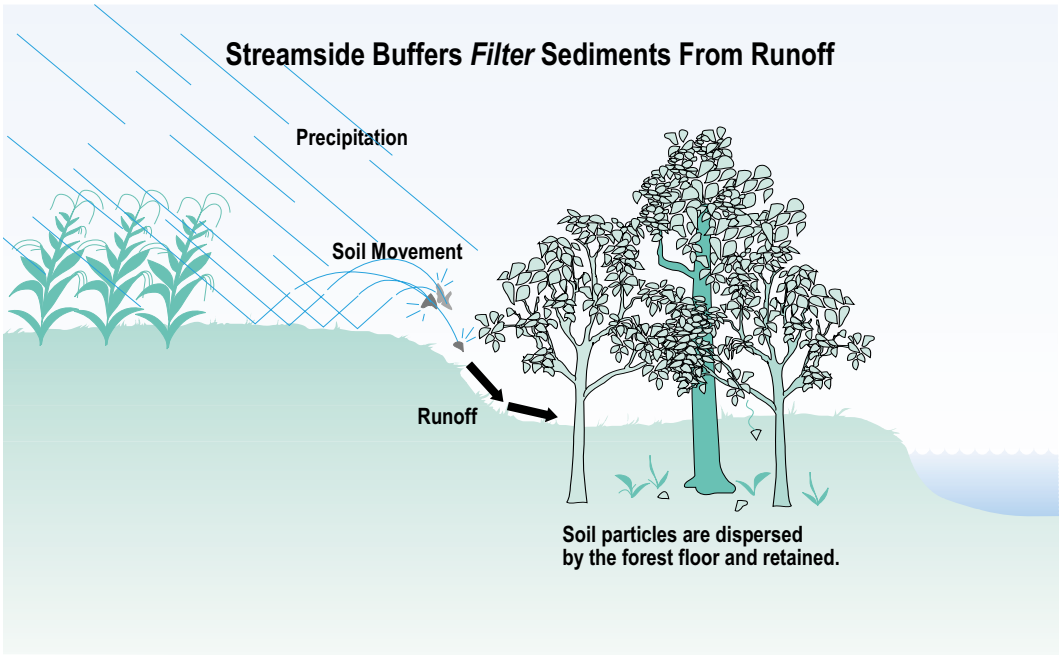
As a protector ...

Trees and other plants in the RPA help to stabilize stream banks and limit erosion in the stream channel. An RPA reduces the volume of stormwater runoff coming from developed areas outside the RPA by slowing it down and allowing it to be absorbed into the soil before it reaches the stream. This helps maintain the base flow of water draining to streams during periods of drought. Tree canopies in an RPA provide shade for streams, which moderates increases in water temperature and supports aquatic life. Finally, an RPA provides scenic and recreational value to surrounding areas, as well as habitat for a variety of wildlife.



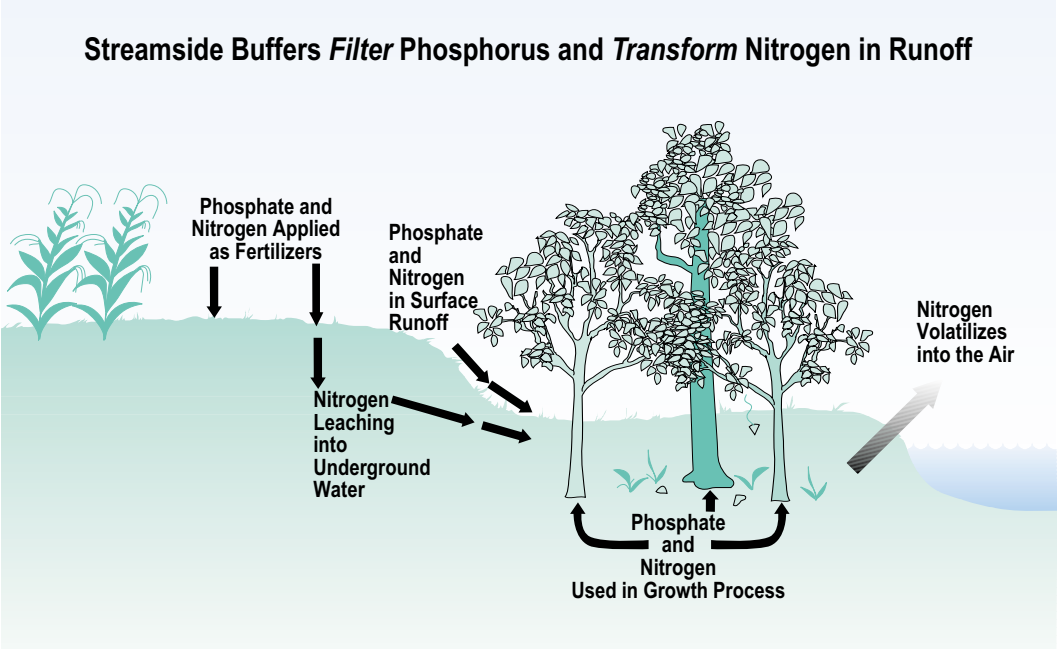
As a filter ...

The RPA reduces the amount of ***sediment*** and ***nutrients*** (such as phosphorus and nitrogen in fertilizers) that are carried by stormwater runoff. In water bodies, sediment smothers plants and clogs fish gills. As stormwater passes through an RPA, sediment settles out or is stopped by vegetative litter (leaves, twigs, etc.) on the ground. ***Phosphorus***, which clings to soil particles, is trapped through this filtering action and is used by the plants in the RPA.



As a transformer ...

The chemical and biological processes in an RPA actually change the chemical structure of some pollutants. The soil can transform ***nitrogen*** in stormwater runoff and in decaying organic debris into mineral forms, which can then be converted into proteins by plants or bacteria. ***Toxic chemicals*** in pesticides and herbicides are also changed into non-toxic forms by biodegrading forces at work in the soil and vegetative litter.



As a nutrient sink ...

The RPA vegetation ***takes up nutrients*** such as phosphorus and nitrogen into plant tissue. In RPAs with moist soils, nutrients in leaf litter can be stored for long periods of time. Excess nutrients that reach streams may make algae grow too fast, which kills fish and blocks the sunlight that other aquatic plants need.

Under the Chesapeake Bay Preservation Ordinance, activities and uses that are permitted and not permitted in the RPA include:

Permitted

- Water-dependent facilities, such as docks, piers and public beaches
- Rebuilding existing structures
- Water wells, boardwalks, trails, pathways and public utility structures
- Selectively removing trees, for reasonable sight lines and vistas or pedestrian walkways (created using natural materials)
- Removing dead or dying vegetation

NOT Permitted

- New development
- Additions to existing structures
- Parking lots
- Secondary structures, such as sheds and gazebos
- Clear-cutting trees
- Filling and grading activities
- Establishing lawns

As habitat and a food source ...

The plants in an RPA serve as an important source of food and shelter for birds and other wildlife. The RPA is also an important part of the food chain in the adjacent stream. Materials such as fallen limbs and leaves, as well as insects, provide a source of food for small organisms in streams. When those small organisms are consumed by larger aquatic life, the energy from that food base is passed along.

What activities are permitted in a Resource Protection Area?

The Chesapeake Bay Preservation Ordinance requires that a 100-foot buffer, which is called the Conservation Area component of the RPA, be maintained in a manner "that retards runoff, prevents erosion, and filters nonpoint source pollution from runoff."

Can trees be removed to establish a view of a lake or water body?

The Chesapeake Bay Preservation Ordinance permits establishing "reasonable" sight lines, but ***only if approved by the Office of Water Quality***. In keeping with the intent of the Chesapeake Bay Preservation Act, any vegetation that has been removed ***must be replaced*** with vegetation that offers an equivalent level of water quality protection. Planting appropriate vegetation, such as native shrubs and ground covers, that don't grow as tall, may provide such protection. Even better, ***pruning tree branches at viewing level provides the desired view without removing the tree and the water quality protection it provides***.

Consequences of Non-Compliance with Resource Protection Area Requirements

The Chesapeake Bay Ordinance states that a "vegetated conservation area that retards runoff, prevents erosion and filters nonpoint source pollution from runoff shall be retained if present and shall be established in areas where it does not exist." The Ordinance further states "in order to maintain the conservation area's functional value, indigenous vegetation may only be removed to provide for reasonable sight lines, pedestrian ways, general woodlot management and best management practices."

Clear-cutting trees, removing other types of vegetation and making other significant modifications to RPAs does not comply with these requirements, and more importantly, may result in water quality problems in nearby waters. Such noncompliance may result in penalties. Violators will be required to restore the RPA to as close to the original condition and in accordance with county guidelines. **An RPA Restoration Plan must be developed and submitted to the Office of Water Quality for review and approval**. The objective of the plan is to restore the RPA's primary functions, so that the RPA may again remove pollutants from stormwater runoff. ***It is not enough to simply allow vegetation to "come back" on its own***. It will take too long to restore the buffer's pollutant removal and other functions. To be most effective, three tiers of vegetation should be established in the buffer:

- Ground cover
- Understory (shrubs and small trees)
- Overstory (canopy trees)

A basic RPA Restoration Plan must include the following elements:

- Owner name and contact information
- Size of the disturbed area
- Layout of plantings (including spacing)
- A legend indicating the type, number, and size of vegetation to be planted
- Timing of the restoration planting
- Cost of plant materials and labor

For all RPA enforcement actions, the county will require that a "bond" be posted, to cover the cost of plant material and labor for installation.

Restoration Procedure

Step 1 - The RPA violation is reported to the Office of Water Quality.

Step 2 - Office of Water Quality (OWQ) staff meets in the field with the property owner to confirm the violation and determine the extent of the RPA disturbance.

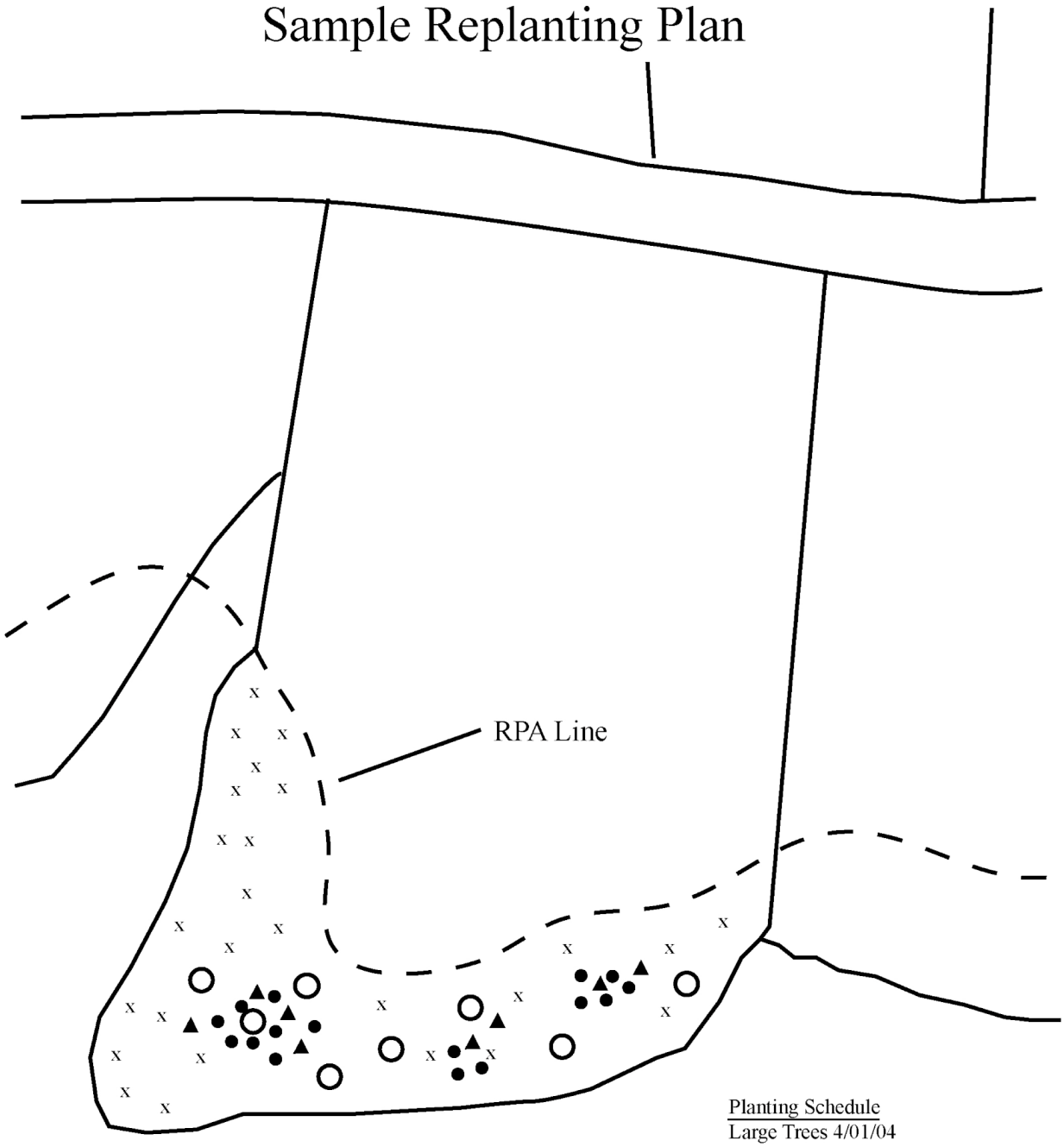
Step 3 - OWQ meets staff with the property owner to review the requirements for an RPA Restoration Plan. This discussion includes the numbers and types of plants to be planted as well as the timing of the planting.

Step 4 - The RPA Restoration Plan is submitted to OWQ. The Water Quality Administrator reviews the plan and suggests final changes, if necessary.

Step 5 - Once the Restoration Plan has been approved, the property owner may proceed with the purchase and installation of the plantings in accordance with the plan.

Step 6 - After the plants have been installed, OWQ staff will inspect site to determine whether the plantings have been installed as called for in the Restoration Plan.

Sample Replanting Plan



Planting Schedule
Large Trees 4/01/04
Ground Cover 4/15/04
Shrubs/Small Trees 4/30/04

x Existing Tree
○ Replacement Tree (Large)
▲ Replacement Shrub/Small tree
● Ground Cover

Plant List
Large trees- Red Maple, River Birch, Sweet Gum
Shrubs/Small Trees- Ironwood, Flowering Dogwood,Hornbeam, Buttonbush, Winterberry
Ground Cover- Columbine, Bee Balm, Aster, Purple Coneflower

General Guidelines for the Restoration of Resource Protection Areas

The purpose of this section is to provide general guidance on the restoration of Resource Protection Areas, whether it is being done voluntarily or as part of an enforcement proceeding. As stated in the State Regulations pertaining to the Chesapeake Bay Preservation Act and Chesterfield County's Chesapeake Bay Preservation Ordinance, "...a 100-foot wide buffer area of vegetation that is effective in retarding runoff, preventing erosion, and filtering non-point source pollution from runoff shall be retained if present, and established where it does not exist." The regulations further state that "the 100-foot wide buffer areas shall be deemed to achieve a 75 percent reduction of sediments and a 40 percent reduction of nutrients." These reduction rates are what have been observed in a fully forested, natural buffer. These two requirements serve as the guiding principle in replanting an RPA that has been cleared or significantly modified.

- Plant not only trees or shrubs, but also other layers of vegetation so that, over time, the area will closely resemble a forested buffer.
- Establish a community of plants similar to what may be found in a natural, *undisturbed* buffer near the site of the restoration. The density, spacing and distribution of the species that naturally occur should be replicated to the maximum extent practicable.
- Utilize the plant list contained in this manual. Be sure to avoid using invasive species such as Kudzu, Johnson grass and similar species.
- Be sure to follow planting specifications discussed in this manual and the recommendations of certified nurseries or landscape contractors. Note that in restoring the RPA, plant spacing requirements should be denser than what the vegetation can support at full maturity. By over-planting in this manner, the RPA pollutant reduction functions that were eliminated or significantly reduced will receive a jump start. The denser the vegetation, the greater the amount of nutrient removal achieved by the newly established plants.
- Use several inches of mulch, tree shelters, grass mats or similar methods to ensure the survivability of the plant material.
- Allow the vegetative "litter" to build up over time, as this material is effective in removing pollutants from stormwater runoff.
- Do not replant the buffer with a lawn.

Restoration Plant Density and Ratios

Vegetation Replacement Rates		
VEGETATION REMOVED	**PREFERRED REPLACEMENT VEGETATION**	**ACCEPTABLE ALTERNATIVE VEGETATION**
1 tree or sapling 1/2 "-2 1/2" caliper	1 tree at equal caliper or greater	**Or** 2 large shrubs at 3'-4' **Or** 10 small shrubs or woody groundcover * at 15"-18"
1 tree > 2 1/2" caliper	1 tree at 1 1/2" - 2" caliper, or 1 evergreen tree at 6' min. ht, per every 4" caliper of tree removed (ex: a 12" cal. tree would require 3 trees to replace it)	**Or** 75% trees at 1 1/2" - 2" and 25% large shrubs at 3'-4' per every 4" caliper of tree removed. (ex: a 16" cal. tree removed would require 3 trees and 1 large shrub) **Or** 10 small shrubs or woody groundcover at 15"-18" per 4"caliper of tree removed (ex: a 8" caliper tree removed requires 20 small shrubs.)
1 large shrub	1 large shrub at 3'-4'	**Or** 5 small shrubs or woody groundcover at 15"-18"
• Woody groundcover is considered to be a woody, spreading shrub that remains close to the ground, to 18" high, such as a shore juniper, juniperus conferta. Vines may not be considered "woody groundcover" for the purpose of vegetation replacement.		

To restore 1/4 acre or less of buffer

(Up to 10,890 square feet or less)

For every 400 square-foot unit (20'x20') or fraction thereof plant:
one (1) canopy tree at 1 1/2" - 2" caliper or large evergreen at 6'
two (2) understory trees at 3/4" - 1 1/2" caliper or evergreen at 4'
or one (1) understory tree and two (2) large shrubs at 3'-4'
three (3) small shrubs or woody groundcover at 15" - 18"

Example:

A 100-foot wide lot x 100-foot wide buffer is 10,000 square feet.
Divide by 400 square feet (20' x 20' unit) to get: 25 units

Units	x	plant/unit	Number of plants
25 units		1 canopy tree	25 canopy trees
		2 understory trees	50 understory trees
		3 small shrubs	75 small shrubs
			150 plants

To restore greater than 1/4 acre of buffer
(More than 10,890 square feet)

The waterside 50% of the buffer (from the waterline inland for the first 50 feet):
For every 400 square-foot unit (20'x20') or fraction thereof plant:
one (1) canopy tree @ $1^1/_2$" - 2" caliper or large evergreen at 6'
two (2) understory trees at $^3/_4$" - $1^1/_2$" caliper or evergreen at 4'
or one (1) understory tree and two (2) large shrubs at 3'-4'
three (3) small shrubs or woody groundcover at 15" - 18"

AND

The landward 50% of buffer (from 50 feet inland to 100 feet inland):

Plant bare root seedlings or whips at 1,210 stems per acre, approximately 6'x 6' on center (minimum survival required after two growing seasons: 600 plants,)

Or

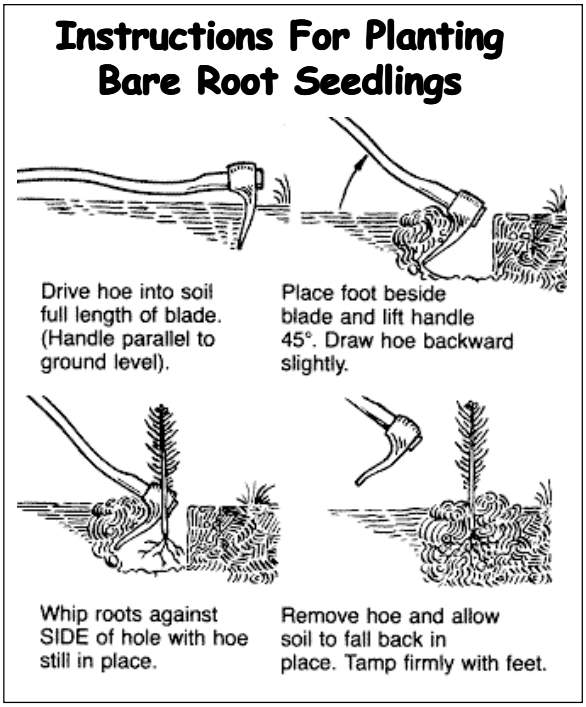
Container grown seedling tubes at 700 per acre approximately 8'x 8' on center (minimum survival required after two growing seasons: 490 plants)

(Information from *Riparian Buffers Guidance Manual* Chesapeake Bay Local Assistance Department)

Guidelines for Planting

STEP 1: SELECT THE RIGHT PLANTS: Select native trees and shrubs that are well adapted to the conditions of your site. If the plants have wire baskets, the top few grids or sections should be cut and removed once the tree is in the hole. This will prevent the tree roots from being girdled by the wire as they grow. Also remove any rope on the tree and cut slits in burlap to allow the roots to get out.

STEP 2: EVALUATE THE SOIL: Test soil drainage before planting. Dig a hole the depth of your planting hole and fill it with water. If the water drains at a rate of less than one inch per hour, consider native plants that don't mind wet soil conditions. Break up clay soils or hoe as much as possible before planting. The best time to plant is during the dormant season. (October-March.)



STEP 3: PLANT SPACING: Attempt to re-create the random spacing that occurs naturally. Plant herbaceous plants 1 to 2 feet apart. Shrubs and small trees 5 to 8 feet apart. Large trees 10 to 15 feet apart

STEP 4: DIG THE HOLE: Dig shallow planting holes three to five times as wide as the root ball. Dig holes as deep as the root ball. In clay soils, dig holes one to two inches shallower than the root ball and cover the top of the root ball with mulch. Don't dig holes deeper than the root balls or put lose soil beneath the roots. Loose soil will settle and compact causing the plant to then be planted too deep. Call Miss Utility, 1 (800) 552-7001 before digging.

STEP 5: BACKFILL THE HOLE, FERTILIZE AND WATER: Backfill holes with soil that has not been amended with organic matter such as peat moss. Backfill half the soil into the hole, then water the plant thoroughly to settle out the air pockets. Finish filling the hole with dirt, and water again.

STEP 6: MULCH: Cover exposed root ball tops and the area around the plant with 2 to 3 inches of organic mulch. Don't allow mulch to touch the trunks of the shrubs and trees. Extend mulched areas out as wide as possible beyond the new plantings. Mulched beds improve the growth of shrubs and trees.

Care for newly planted landscapes

- Remove tags and labels from plants.
- Water new plants to promote root growth.
- Mulch with 2 to 3 inches of organic mulch.
- Keep mulch away from tree trunks and shrub stems.
- Don't use plastic beneath the mulch around trees and shrubs because it blocks air and water exchange. (Consider landscape fabrics for weed control.)
- Most trees do not need to be staked. Only stake trees with large crowns for one year.
- Remove any rope, tags, etc., from plants within one year of planting.
- Do not use wire on tree bark. If staking is needed, consider using 1-inch fabric material around tree trunks if necessary.
- Most trees should not have their trunks wrapped.
- Prune to control shape, remove dead, damaged or diseased branches. It is best to prune in winter or early spring.

Resource Protection Area Plant List

This plant list contained in this manual includes plants that are native to Virginia and are well adapted to the conditions commonly found in a riparian buffer. The list is broken down into the categories of large trees, small trees, shrubs, groundcovers, ferns and vines. The plants are listed alphabetically by their Latin names, with common names in bold letters. Information about light and moisture requirements is included along with a brief description of the plants characteristics.

Why use native plants?

Native plants are adapted to the local soil, rainfall and temperature conditions, and have developed natural defenses to withstand many types of insects and diseases. Because of these traits, native plants will grow without a lot of maintenance. Wildlife species evolve with plants: therefore they use native plant communities as their habitat. Non-native plants can be invasive and will smother vegetation. This can cause the ecosystem to lose plant diversity, and destroy habitat and food sources for wildlife.

Wildlife benefits

Most of the plants listed provide some type of food or shelter for wildlife. A list of some of the species that are known to use the plant is given. The plant however, may provide food and shelter to many other species that are not listed.

Soil

Many of the plants on the list grow in a variety of soil types, so soil information was omitted. It is always wise to contact the Extension Office for a soil test prior to selecting plants. You will especially want a test if your site has soil that is heavily compacted, sandy or has heavy clay. The Chesterfield Extension office can be reached at 751-4401.

Site design

Arrange your native plants in aggregate groups or groves rather than individual plants surrounded by a lawn. Aggregate plantings resemble natural plant communities that wildlife use as habitat. Do not plant on a grid pattern with plants evenly spaced. Attempt to recreate the random spacing that occurs in natural plant communities. Loosely group similar species together and allow them to overlap and intersperse with other species. If you are interested in attracting wildlife, incorporate feeders and nesting boxes, and if needed, a source for water, into your planting.

COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	BENEFITS
LARGE TREES			
Red Maple Acer rubrum	Light: partial to full sun Moisture: wet to well drained (Tolerates flooding)	Red March bloom, red fall color, medium to fast growth rate, height 40'-60', aggressive- do not over plant	Food: Seeds and sap. Wildlife: chickadees, robin, cardinal, finches, chipmunk, deer
Red Buckeye Aesculus pavia	Light: shade to full sun Moisture: moist well drained soil, dislikes dry soil	6" panicles of salmon to medium red flowers in spring short lived; blooms at early age, moderate growth rate height, 10'-20'	Flowers attract hummingbirds
Eastern Red Cedar Juniperus virginiana	Light: full sun Moisture: well drained to dry	Narrow shape, thick foliage, many blue berries, nesting site for a variety of birds, medium growth rate, height 30'-50'	Food: berries Wildlife: quail, woodpeckers, robin, bluebird, warblers, grosbeaks, cedar waxwing, mockingbird, deer
Southern Magnolia Magnolia grandiflora	Light: partial shade to full sun Moisture: well drained soil; tolerates high moisture	Large fragrant flowers and dense foliage, slow to moderate growth rate, height 40'-80'	Food: seeds, fruit Wildlife: squirrels, attracts a variety of birds, good value as a cover tree for nesting
Virginia Pine Pinus virginiana	Light: full sun Moisture: well drained to dry	Colonizer of dry sites, 1"-3" needles, medium growth rate, height 50'-80'	Food: seeds, needles Wildlife: doves, chickadees, nuthatches, beaver, squirrel, deer
Loblolly Pine Pinus taeda	Light: full sun Moisture: wet to moist	Long needles, open branches, fast growth rate, height 70'-90'	Food: sap Wildlife: doves, woodpeckers, nuthatches, brown creeper, finches, squirrels
Short Leaf Pine Pinus echinata	Light: full sun Moisture: well drained to dry	Fire and drought tolerant, fast growth rate, height' 80'-100'	Food: seeds, needles Wildlife: a variety of songbirds, dove, turkey, small mammals, needles used for nest construction
River Birch Betula nigra	Light: partial to full sun Moisture: wet to well drained (Tolerates flooding)	Unique peeling reddish-white bark, medium to fast growth rate, height 30'-50'	Food: fruit, sap, buds. Wildlife: ducks, nuthatches, chickadees, finches, fox sparrow, rabbit
Shagbark Hickory Carya ovata,	Light: Partial to full sun Moisture: moist	Common along streams and on moist hillsides, golden yellow fall color, slow growth rate, height 70'-90'	Food: nuts Wildlife: deer, turkey, wood duck, fox, squirrel, chipmunk
Mockernut Hickory Carya tomentosa	Light: shade to full sun Moisture: dry to wet	Beautiful yellow fall color, height 60'-80', slow growth rate	Food: nuts Wildlife: wood duck, red-bellied woodpecker, fox, squirrels, beaver, rabbit, chipmunk, turkey, deer
Pignut Hickory Carya glabra	Light: shade to partial Moisture: dry to well drained	Bitter fruit, strong wood used for tools, fast growth rate, height 50'-60'	Food: fruit, seeds Wildlife: squirrel, chipmunk, deer
Hackberry Celtis occidentalis	Light: partial to full sun Moisture: wet to well drained	Adapted to a wide range of conditions, medium to fast growth rate, height 35'-60'	Food: fruit, twigs. Wildlife: mockingbird, robin, mourning dove, quail, bluebird, catbird, thrushes, sparrows, squirrel, deer.

COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	BENEFITS
American Beech Fagus grandifolia	Light: partial to full sun (prefers partial when young) Moisture: moist to well drained	Beautiful, smooth silvery white bark, excellent shade tree, slow growth rate height 50'-100'	Food: nuts, sap, buds. Wildlife: wood duck, quail, squirrel, chipmunk, woodpeckers, blue jay, tufted titmouse, chickadees, nuthatches
White Ash Fraxinus americana	Light: partial to full sun Moisture: moist to well drained	Yellow to dark maroon fall color, medium growth rate, height 50'-80'	Food: seeds foliage Wildlife: cardinal, finches, grosbeaks, wood duck, red-winged blackbird, squirrel, deer
Sweetgum Liquidambar styraciflua	Light: partial to full sun Moisture: wet to well drained	Adapted to wide range of conditions, yellow-red fall color, medium to fast growth rate, height 60'-80'	Food: seeds Wildlife: mourning dove, carolina wren, finches, junco, beaver, squirrel, chipmunk
Tulip Poplar Liriodendron tulipifera	Light: partial to full sun Moisture: moist to well drained	Graceful, large yellow flower, golden yellow fall color, fast growth rate, height 70'-120' or more	Food: seeds, sap, nectar Wildlife: chickadees, woodpeckers, cardinal, mocking bird, finches, hummingbird, honeybees
Black Gum Nyssa sylvatica	Light: partial to full sun Moisture: wet to well drained	Beautiful, shiny green leaves, bright red fall color, bluish berries, slow growth rate, height 25'-35'	Food: berries Wildlife: wood duck, thrushes, woodpeckers, eastern kingbird, cedar waxwing squirrel
Sourwood Oxydendrum arboreum	Light: shade to full sun Moisture: well drained	Pyramidal shape with drooping branches, white flowers, brilliant scarlet fall color, slow growth rate, height 25'-35'	Food: twigs Wildlife: deer, provides nesting habitat for birds
Sycamore Platanus occidentalis	Light: partial to full sun Moisture: wet to well drained	Unique white and brown peeling bark, fast growth rate, among the tallest of native trees, height 75'-100'	Food: seeds Wildlife: finches, squirrel. Also provides nesting cavities.
Bald Cypress Taxodium distichum	Light: partial to full sun Moisture: flooded to wet	Tall graceful tree with feathery light green foliage, deciduous conifer, medium growth rate, height 50'-70'	Food: seeds Wildlife: ducks, marsh birds
White Oak Quercus alba	Light: partial to full sun Moisture: well drained	Majestic, light scaly bark, variable fall color, slow to medium growth rate, height, 50'-90'	Food: acorns are a very important food source Wildlife: quail, turkey, grouse, ducks, woodpeckers, blue jay, brown thrasher, towhee, nuthatch, squirrel, chipmunk, raccoon, gopher, opossum, deer
Red Oak Quercus rubra,	Light: partial to full sun Moisture: well drained	Grows on a variety of soils and topography, important lumber species, moderate to fast growth rate, height 60'-75', transplants easily	Same as White Oak
Southern Red Oak Quercus falcata	Light: full sun Moisture: moist to well drained	Large crown and limbs, good shade tree, variable fall color, medium to slow growth rate, height 70'-80'	Same as White Oak

COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	BENEFITS
Swamp Chestnut Oak Quercus michauxii	Light: partial to full Moisture: moist to well drained near streams	Hard, tough, strong, wood used for veneer, boards, fuel and fence posts; and extensively for making baskets, moderate growth rate, height 60'-80'	Same as White Oak
Willow Oak Quercus phellos	Light: partial to full sun Moisture: moist to well drained	Adapted to a range of conditions, small willow like leaves, medium to fast growth rate, height 70'-80'	Same as White Oak
Shumard Oak Quercus shumardii,	Light: full sun Moisture: dry to wet	Nearly identical to Northern Red Oak, leaves turn brown-red in fall, height 40'-60'	Same as White Oak
Post Oak Quercus stellata,	Light: partial to full sun Moisture: dry to well drained	Medium-sized tree that is most abundant in dry poorer soils, slow growth rate, drought resistant, height 40'-50'	Same as White Oak
Black Oak Quercus velutina	Light: full sun Moisture: well drained	Similar to and often hybridizes with Red Oak, medium to fast growth rate, height 50'-60'	Same as White Oak
Sassafras Sassafras albidum	Light: partial to full sun Moisture: moist to well drained	Dark green leaves of three different shapes, medium growth rate, height 30'-60'	Food: fruit Wildlife: quail, catbird, flycatchers, mockingbird, pileated woodpecker.
SMALL TREES			
Downy Serviceberry Amelanchier arborea	Light: shade to full sun Moisture: wet to well drained	White flowers in early spring, blooms during shad run, edible berries in June, medium growth rate height 15'-30'	Food: berries, twigs. Wildlife: thrushes, brown thrasher, towhee, catbird, woodpeckers, orioles, tanagers, robin, junco, cardinal, squirrel, beaver, deer
Canada Serviceberry Amelanchier canadensis	Light: shade to full sun Moisture: wet to well drained	White flowers in early spring, blooms during shad run, edible berries in June, more shrub like than Downy Serviceberry, medium growth rate height 15'-30'	Food: berries, twigs. Wildlife: thrushes, crow, bluebird, brown thrasher, catbird, woodpeckers, tanagers, robin, junco, cardinal, squirrel, beaver, deer
Allegheny Serviceberry (Shad Bush) Amelanchier laevis	Light: partial to full sun Moisture: moist	Found in moist ravines and protected slopes, fruit is used as a preserve and in pies, moderate growth rate, height 15'-25'	Food: berries, twigs. Wildlife: thrushes, brown thrasher, catbird, woodpeckers, orioles, tanagers, robin, junco, cardinal, squirrel, beaver, deer
Ironwood Carpinus caroliniana	Light: shade to partial sun Moisture: wet to moist	Unique fluted gray bark, slow growth rate, height 20'-40'	Food: seeds, buds Wildlife: wood duck, quail, beaver, squirrel, deer
Redbud Cercis canadensis	Light: shade to full sun Moisture: moist to well drained	(Blooms best in full sun, but may lose drought tolerance) Understory tree of hardwood forests, bright purplish red flowers appear in early spring, moderate growth rate, height 20'-30'	Food: seeds, leaves Wildlife: butterflies, cardinal quail, pheasants, goldfinch, other birds, deer, squirrel

COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	BENEFITS
Fringetree Chionanthus virginicus	Light: shade to full sun Moisture: wet to well drained	Beautiful white flowers, fragrant blue fall berries, slow growth rate, height 8'-20'	Food: berries Wildlife: rabbit, deer
Flowering Dogwood Cornus florida	Light: shade to partial sun Moisture: well drained	Large white flowers symbolizing spring in the Eastern woodlands, red berries, slow to medium growth rate, height 15'-30'	Food: berries, foliage, twigs Wildlife: cardinals, robins, quail, woodpeckers, cedar waxwing, vireos, squirrel, rabbit
Silky Dogwood Cornus amomum	Light: partial to full sun Moisture: wet to moist	White flowers, bluish fruit, medium growth rate, height 6'-10'	Food: berries, twigs Wildlife: woodpeckers, vireos, cardinal, finches, pine warbler, deer
Silverbell Halesia tetraptera	Light: partial to full sun Moisture: moist to well drained	Dainty white bell shaped flowers in early spring, moderate growth rate, height 20' to 40'	Food: fruits Wildlife: squirrel, woodpeckers, other birds
American Holly Ilex opaca	Light: partial to full sun Moisture: moist to well drained	Dioecious, shiny green leaves, red berries on female plant, medium growth rate, height 20'-40'	Food: berries, sap Wildlife: thrushes, woodpeckers, mockingbird, mourning dove, squirrel, deer
Sweetbay Magnolia Magnolia virginiana	Light: partial to full sun Moisture: wet to well drained	Almost evergreen waxy foliage, large white flowers, red berries, medium to fast growth rate, height 15'-30'	Food: seeds, twigs Wildlife: red-eyed vireo, woodpeckers, towhee, squirrel, deer
Eastern Hop Hornbeam Ostrya virginiana	Light: partial to full sun Moisture: moist to well drained	Graceful drooping branches, slow growth rate, height 20'-40'	Food: nuts buds Wildlife: wood duck quail, rabbit, deer, squirrel
SHRUBS			
Bottlebrush Buckeye Aesculus parvifolia	Light: partial shade to sun Moisture: moist	White flowers in summer golden yellow fall color, important food source for hummingbirds, height 8'-12'	Food: nectar, seeds Wildlife: hummingbirds, squirrel
Common (Smooth) Alder Alnus serrulata	Light: partial to full sun Moisture: wet	Tall with multiple trunks, small white flowers, good stream bank stabilizer, height 10'-20'	Food: seeds, buds Wildlife: ducks, quail, finches, mourning dove, deer
Red Chockcherry Aronia arbutifolia	Light: partial to full sun Moisture: wet to well drained	Small white flowers, bright red fruit, more fruit in full sun, slow growth rate, height 6'-10'	Food: berries, buds Wildlife: grouse, chickadees, cedar waxwing, meadowlark, squirrel
Black Chockcherry Aronia melanocarpa	Light: shade to full sun Moisture: wet to moist	More adapted to wetter areas than red chokecherry, dark purple berries, slow growth rate, height 3'-5'	Food: berries, buds Wildlife: grouse, chickadees, cedar waxwing, meadowlark, squirrel
American Beautyberry Callicarpa Americana	Light: Partial shade to sun Soil; moist to dry	Small white to pink flowers in summer; clusters of glossy pink-purple to red-violet berries, height 4'-6'	Food: berries Wildlife: berries attract a variety of birds

COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	BENEFITS
Carolina Allspice Calycanthus floridus	Light: shade to part sun Moisture: medium wet, well-drained, tolerant of a wide range of soils, prefers rich loams	Yellow fall foliage, stems and leaves are fragrant, grows somewhat taller in shade than in sun, height 6'-10'	Foliage provides browse for deer
Red Twig Dogwood Cornus sericea	Light: part shade to full sun Moisture: moist to wet	Bright red winter stems, small white flowers in late spring, height 6'-10'	Food: berries Wildlife: deer, rabbit, beaver, songbirds, quail, partridge, ducks, crows, and other birds.
Greystem Dogwood Cornus racemosa	Light: shade to full sun Moisture: wet to moist	White flowers, white berries, slow growth rate, height 10'-15'	Food: berries, twigs Wildlife: woodpeckers, vireos, cardinal, finches, pine warbler, deer
Strawberrybush Euonymus americanus	Light: shade to partial sun Moisture: wet to dry	Green twigs, interesting red and orange fruit, medium growth rate, height 4'-7'	Food: foliage Wildlife: deer, rabbit
American Witch Alder Fothergilla gardenii	Light: partial shade to full sun Moisture: moist to wet	Creamy white flowers in spring with a sweet honey fragrance, orange to scarlet fall foliage, height 1.5'-3'	Food: seeds Wildlife: squirrel
Witch Hazel Hamamelis virginiana	Light: partial to full sun Moisture: moist to well drained	Small yellow flowers Oct.-Dec., medium growth rate, height 20'-25'	Food: seeds, twigs Wildlife: grouse, deer
Wild Hydranngea Hydrangea arborescens	Light: part sun to shade Moisture: moist	Best grown in average, medium wet, well-drained soil in part shade, Yellowish brown fall foliage, height 3'-5'	Food: foliage, flowers Wildlife: bees, deer, turkey, some song birds
Oakleaf Hydrangea Hydrangea quercifolia	Light: part shade to full sun Moisture: medium wet, well drained	White flowers which slowly turn pinkish purple with age, long late spring to summer bloom period, leaves turn attractive shades of bronze, crimson or purple in autumn, height 4'-6'	Food: seeds Wildlife: seeds eaten by a variety of birds
Holly-Possumhaw Ilex decidua	Light: part shade to full sun Moisture: medium wet	Dioecious prefers moist, acidic, organic soils. Some tolerance for wet conditions, height 7'-15'	Food: berries Wildlife: opossum, woodpecker, cedar waxwing, thrushes, finches, cardinal, chickadees, deer
Inkberry Ilex glabra	Light: partial to full sun Moisture: wet to moist	Dioecious, evergreen, black berries, slow growth rate, height 6'-8'	Food: berries Wildlife: woodpecker, cedar waxwing, thrushes, finches, cardinal, chickadees, deer
Winterberry Ilex verticillata	Light: partial to full sun Moisture: wet to moist	Dioecious, bright red berries, slow growth rate. Height 6'-10'	Food: berries Wildlife: woodpecker, cedar waxwing, thrushes, finches, cardinal, chickadees, deer
Virginia Sweetspire Itea virginica	Light: shade to full sun Moisture: moist to well drained	Fragrant white flowers in mid-summer, slow to medium growth rate, height 3'-5'	Nectar provides food for some songbirds, butterflies, other insects

COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	BENEFITS
Yaupon Holly Ilex vomitoria	Light: shade to full sun Moisture: moist to dry	Provides year round cover for many types of wildlife, small, shiny red-orange berries on female plants that persist into the winter, moderate to fast growth rate, height 15'-20'	Food: berries Wildlife: turkey, bobwhite, many songbirds, deer
Dwarf Yaupon Holly Ilex vomitoria 'nana	Light: shade to full sun Moisture: moist to dry'	Provides year round cover for many types of wildlife, small, shiny red-orange berries on female plants that persist into the winter, moderate to fast growth rate, height 5'	Food: berries Wildlife: turkey, bobwhite, many songbirds, deer
Mountain Laurel Kalmia latifolia	Light: shade to full sun Moisture: moist to well drained	Evergreen, showy white to pink flowers, slow growth rate, height 7'-15'	Attracts butterflies
Sweetbells Leucothoe racemosa	Light: partial shade to full sun Moisture: moist to wet	Found along marshy stream banks, and forest edges, showy, fragrant flowers May-June, height 4'-6'	Attracts birds and butterflies
Spicebush Lindera benzoin	Light: shade to full sun Moisture: wet to well drained	Fragrant twigs and leaves, red berries, yellow fall color, slow growth rate height 6'-12'	Food: berries Wildlife: thrushes, catbird, kingbird
Southern Wax Myrtle Myrica cerifera	Light: part sun to full sun Moisture: dry to moist	Evergreen small tree or shrub, leaves fragrant when crushed	Food: berries on female plants Wildlife: small mammals and a variety of birds
Flame Azalea Rhododendron calendulaceum	Light: partial to full sun Moisture: well drained to dry	Deciduous, showy yellow to red orange flowers, slow growth rate, height 4'-7'	Food: leaves, nectar Wildlife: hummingbird, deer, butterflies, other insects
Carolina Rhododendron Rhododendron carolinianum	Light: partial shade to full sun Moisture: moist, well drained	Flowers in early spring, crushed leaves have an aromatic fragrance	Food: leaves Wildlife: deer, winter cover for songbirds
Catawba Rhododendron Rhododendron catawbiense	Light: shade to full sun Moisture: moist, well drained	Evergreen species that produces showy purple or pink blooms	Wildlife: Serves as cover for songbirds, gamebirds, and small mammals (especially in Winter)
Rosebay Rhododendron Rhododendron maximum	Light: partial shade to full sun Moisture: moist, well drained	One of largest and hardiest of Rhododendrons, white or purplish flowers, height 15'-30'	Wildlife: a good cover tree for birds and small mammals, especially during colder or windy weather
Pinxterbloom Azalea Rhododendron periclymenoides	Light: partial shade to sun Moisture: moist, well drained	Variable flower color but often is cotton candy pink to white, flowers before leaves emerge, some are fragrant, height 6'-10'	Food: leaves, nectar Wildlife: hummingbird, deer, butterflies, other insects
Swamp Azalea Rhododendron viscosum	Light: shade to partial sun Moisture: wet to moist	Deciduous, white flowers, slow growth rate, height 3'-8'	Food: leaves, nectar Wildlife: hummingbird, deer, butterflies, other insects
Winged Sumac Rhus copallina	Light: part sun to full sun Moisture: dry to medium moisture	Greenish white flowers in upright cluster; conical cluster of dark red small fruit, height 10'-15'	Food: seeds, foliage flowers Wildlife: deer, thrushes, vireos, woodpecker, other songbirds and small mammals, butterflies

COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	BENEFITS
Smooth Sumac Rhus glabra	Light: full sun Moisture: well drained to dry	Dioecious, forms groves, greenish crimson colored fruit, bright red fall color, fast growth rate, height 9'-15'	Food: fruit, twigs, foliage Wildlife: quail, bluebird, catbird, robin, mockingbird, rabbit, deer
American Snowbell Styrax americanus	Light: partial shade to full sun Moisture: moist	White flowers in mid spring; sweet fragrance, height 6'-10'	Fruit eaten by a variety of birds, provides habitat for wildlife
Highbush Blueberry Vaccinium corymbosum	Light: partial to full sun Moisture: wet to well drained	Small urn-shaped white flowers, blue berries, slow growth rate, height 6'-12'	Food: berries, foliage, twigs Wildlife: grouse, woodpeckers, kingbird, blue jay, robin, bluebird, tanagers, squirrel
Lowbush Blueberry Vaccinium angustifolium	Light: partial to full sun Moisture: well drained to dry	Low growing, small white flowers, slow growth rate, height 1'-2'	Food: berries, foliage Wildlife: grouse woodpeckers, kingbird, blue jay, robin, orioles, tanagers, squirrel
Sparkleberry Vaccinium arboreum	Light: partial shade to sun Soil; dry to moist, drought tolerant	Largest of the native blueberries, small, fragrant white flowers in spring, berries last into winter, height 6'-20'	Food: blueberries Wildlife: many species of songbirds, wild turkey, ruffled grouse, nectar plant for butterflies, larva food for Henry's elfin butterflies
Mapleleaf Viburnum Viburnum acerifolium	Light: shade to full sun Moisture: moist, well drained	White flowers in early Summer, can form dense colonies, height 7'	Food: berries (often persists well into winter) Wildlife: many songbirds, gamebirds, and small mammals, deer
Arrowwood Viburnum dentatum	Light: partial to full sun Moisture: moist to well drained	Dense foliage, white flowers, small blue-black berries, wood used to make arrows, medium growth rate, height 6'-10'	Food: berries, foliage Wildlife: grouse, cedar waxwing, brown thrasher, squirrel deer
Swamp Viburnum (Wild Rasin) Viburnum nudum	Light: shade to full sun Moisture: moist	Typical of wet sites, small white flower in May, 6-8 feet tall.	Food: leaves, twigs Wildlife: deer
Blackhaw Viburnum Viburnum prunifolium	Light: partial to full sun Moisture: moist to well drained	White flower clusters, blue berries, red fall color, slow to medium growth rate, height 12'-15'	Food: berries, foliage Wildlife: grouse cedar waxwing, brown thrasher, squirrel deer
LOW SHRUBS & GROUNDCOVERS			
Bearberry Arctostaphylos uva-ursi	Light: full sun Moisture: dry, well drained	Evergreen ground cover, bright red berries persist on plants through winter,	Food: berries Wildlife: Fruits eaten by songbirds and gamebirds
Green and Gold Chrysogonum virginianum	Light: part shade to shade Moisture: well drained	Height 6" to 9" star shaped bright yellow flowers in spring, sporadically in summer	Good ground cover for naturalized areas.
Dutchman's Breeches Dicentra cucullaria	Light: part shade to full shade Moisture: moist	Early spring, wildflower which typically occurs on forest and along streams, fragrant white, pantaloon shaped flowers, height 1'	

COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	BENEFITS
Wintergreen Gaultheria procumbens	Light: full shade to part sun Moisture: moist, well drained, will not tolerate drought	Flowers are urn-shaped, white with hints of pink, blooms May through summer, fragrant leaves and fruit	Food: berries Wildlife: deer chipmunk, fox, squirrel, bobwhite, mouse
Shore Juniper Juniperus conferta	Light: full sun Moisture: dry, well drained	Does not like wet feet; blue-green color; slow growth, height 10".	Groundcover that can be used to control erosion on slopes. Low maintenance
Creeping Juniper Juniperus horizontalis	Light: full sun Moisture: dry to medium wet, well drained	A flat, low-growing, evergreen shrub, creeps horizontally and roots where it touches the ground, 4-6" tall, medium green foliage with blue overtones, becomes tinged with burgundy in winter, berry-like seed cones infrequently produced.	Groundcover that can be used to control erosion on slopes. Low maintenance
Cardinal flower Lobelia cardinalis	Light: partial to full sun Moisture: wet to moist	Brilliant red tubular shaped flowers July-Sept., height 2'-3'	Food: nectar Wildlife: hummingbird, butterflies, other insects
Virginia Bluebells Mertensia virginica	Light: partial shade Moisture: moist, cool, high in organic matter	One of the most beautiful native wildflowers, blue/pink flowers in early spring, height 12-24"	Food: nectar Wildlife: hummingbird, butterflies, other insects
Woodland Phlox Phlox divaricata	Light: part shade to full sun Moisture: medium wet, well drained	Occurs in rich woods, fields and along streams. Loose clusters of slightly fragrant, tubular, lilac to rose to blue flowers, can form large colonies as leafy shoots spread along the ground height, 12-15"	Food: nectar Wildlife: hummingbird, butterflies, other insects
Evergreen Blueberry Vaccinium darrowii	Light: partial sun to shade Moisture: dry to moist	Small evergreen shrub, produces fruit in late spring	Food: fruit Wildlife: deer, other mammals, birds
ADDITIONAL PERENNIALS			
Columbine Aquilegia canadensis	Light: part shade to full sun Moisture: moist well drained Tolerates a wide range of soils.	Red and yellow flowers in spring, prefers rich, moist soils with light to moderate shade	Food: nectar Wildlife: hummingbird
Jack In The Pulpit Arisoema triphyllum	Light: shade to partial shade Moisture: moist to wet, rich hummus	Needs constantly moist soil rich in organic matter, does poorly in heavy clay soils, may be grown from seed, but takes five years for plant to flower, best left undisturbed in the, wild or native plant garden	
Wild Ginger Asarum canadense	Light: shade Moisture: rich moist	Dark green leaves, perennial, purplish blooms usually hidden by foliage	
New England Aster Aster novae-angliae	Light: partial to full sun Moisture: wet to moist	Purple/violet flowers Sept.-Nov., height 2'-5'	Food: nectar, seeds, leaves Wildlife: butterflies, other insects, limited use by birds and small mammals

COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	BENEFITS
New York Aster Aster novi-belgii	Light: full sun Moisture: medium moisture	Typically grows 12-15" tall, features a profuse bloom of clear rose flowers (to 1.5" across) which can entirely cover the plant with bloom from mid-August until early October	Attracts butterflies
Flat-top White Aster Aster umbellatus	Light: part to full sun Moisture: moist to wet	White flowers, blooms July-Sept., height 1-7', one of the first asters to bloom	Attracts butterflies
Dwarf Larkspur Delphinium tricorn	Light: part shade to sun Moisture:	Blue, white, purple, pink flowers in spring, height 18-36"	Attracts butterflies
Bleeding Heart Dicentra eximia	Light: part to full shade Moisture: rich moist, well drained. Intolerant of wet soils in winter and dry soils in summer.	Rose pink to purplish red flowers, Naturalizes by self-seeding in favorable environments	Nectar and seeds attract butterflies and birds
Purple Coneflower Echinacea purpurea	Light: full sun Moisture: moist to well drained	Large daisy-like purple flowers June-July, height 3'-4'	Food: nectar, seeds Wildlife: butterflies, other insects, goldfinch
Joe Pye Weed Eupatorium fistulosum	Light: partial to full sun Moisture: wet to moist	Large purple/white flower clusters July-Aug., height 5'-10'	Food: nectar Wildlife: butterflies, other insects
Dwarf Iris Iris cristata	Light: partial shade to full sun Moisture: organically rich, well drained, medium moisture	Grows best in part shade, will tolerate close to full shade, soil must be kept consistently moist in full sun, grows well on well-drained slopes.	Attracts butterflies
Virginia Blueflag Iris virginica	Light: full sun Moisture: medium to wet, best grown in wet, boggy, acidic, sandy soils	Violet to blue flowers with yellow and white falls, height 1'-3'	Attracts hummingbirds and butterflies
Bee Balm Monarda didyma	Light: full sun Moisture: moist to well drained	Scarlet colored tubular-shaped flowers June- Aug., height 2'-4'	Food: nectar Wildlife: hummingbirds, butterflies, other insects
Solomon's Seal Polygonatum commutatum	Light: shade to partial shade Moisture: rich moist humus	Creamy green flowers, in spring with blue-black fruits in early to midsummer	Food: berries Wildlife: birds, small mammals
Black-eyed Susan Rudbeckia fulgida or Rudbeckia laciniata	Light: partial to full sun Moisture: moist to well drained	Yellow flowers with dark center June- Aug., height 2'-3'	Attracts butterflies
FERNS			
Southern Ladyfern Athyrium asplenioides	Light: shade Moisture: moist	Slow spreading fern 1'-3' tall. Prefers to have its feet wet. Can grow in woods and in the open. Will make a dense stand over time	

COMMON NAME/ SCIENTIFIC NAME	GROWTH CONDITIONS	CHARACTERISTICS	BENEFITS
Cinnamon Fern Osmunda cinnamomea	Light: full shade to part shade Moisture: medium to wet	Native fern which occurs in moist, boggy ground along streams and on shaded ledges, Typically grows in clumps to 2-3' tall, but with constant moisture can reach 6' in height	
Royal Fern Osmunda regalis	Light: full shade to part shade Moisture: medium to wet	Prefers moist, rich, humusy, acidic soils, but adapts to lesser conditions. Grows in clumps to 2-3' tall, but with constant moisture can reach 6' in height.	
Christmas Fern Polystichum acrostichoides	Light: full to part shade Moisture: dry to medium	Evergreen fronds provide good winter interest for the landscape. A good plant for massing on slopes (including dryish, rocky ones) to help combat soil erosion.	
VINES			
Crossvine Bignonia capreolata	Light: part shade to full sun Moisture: medium moisture	Fast growing vine with orange-red flowers, typically grows 35-50', similar to Trumpetvine	Food: nectar Wildlife: hummingbird, bees
Trumpetvine Campsis radicans	Light: partial shade to sun Moisture: medium moisture (grows in most soils)	A woody vine which grows up to 30 feet tall, best known for its magnificent bright red flowers, can be invasive	Food: nectar Wildlife: a major food source of Ruby-throated Hummingbirds, used by goldfinch for cover
Virgin's Bower Clematis virginiana	Light: partial shade to sun Moisture: dry to moist (prefers moist)	White flowers in late summer to fall, fast growing, height 18"	
Virginia Creeper Parthenocissus quinquefolia	Light: shade to full sun Moisture: medium wet, well drained	Climbing vine, can grow up to 50 feet, five leaved plant often confused with poison ivy, rapid growth rate	Food: berries, leaves, stems Wildlife: bluebird, cardinal, chickadees, woodpeckers, mice, skunk, chipmunk, squirrel, deer

Invasive Plants

The following list contains non-native plants that should NOT be used in an RPA restoration. These plants can be invasive in the right conditions and will smother vegetation. This can cause the ecosystem to lose plant diversity and destroy habitat and food sources for wildlife.

Highly Invasive Species

Tree-of-heaven *Ailanthus altissima*
Garlic mustard *Alliaria petiolata*
Alligator weed *Alternanthera philoxeroides*
Porcelain-berry *Ampelopsis brevipedunculata*
Asiatic sand sedge *Carex kobomugi*
Oriental bittersweet *Celastrus orbiculata*
Short-fringed knapweed *Centaurea dubia*
Spotted knapweed *Centaurea maculosa*
Canada thistle *Cirsium arvense*
Scotch Broom, *Cytisus scoparius*
Chinese yam *Dioscorea oppositifolia*
Autumn olive *Elaeagnus umbellata*
Winged burning bush *Euonymus alata*
Hydrilla *Hydrilla verticillata*
Cogon grass *Imperata cylindrica*
Chinese lespedeza *Lespedeza cuneata*
Chinese privet *Ligustrum sinense*
Japanese honeysuckle *Lonicera japonica*
Morrow's honeysuckle *Lonicera morrowii*
Standish's honeysuckle *Lonicera standishii*
Purple loosestrife *Lythrum salicaria & L. virgatu*
White sweet clover *Melilotus alba*
Yellow sweet clover *Melilotus officinalis*
Japanese stilt grass *Microstegium vimineum*
Aneilima *Murdannia keisak*
Parrot feather *Myriophyllum aquaticum*
European water-milfoil *Myriophyllum spicatum*
Common reed *Phragmites australis*
Japanese knotweed *Polygonum cuspidatum*
Mile-a-minute *Polygonum perfoliatum*
Kudzu vine *Pueraria lobata (P. montana)*
Lesser celandine *Ranunculus ficaria*
Multiflora rose *Rosa multiflora*
Wineberry *Rubus phoenicolasius*
Johnson-grass *Sorghum halepense*

Moderately Invasive Species

Norway maple *Acer platanoides*
Quack grass *Agropyron repens*
Rhode Island bent-grass *Agrostis tenuis*
Five-leaf akebia *Akebia quinata*
Wild onion *Allium vineale*
Mugwort *Artemisia vulgaris*
Jointed grass *Arthraxon hispidus*
Giant reed *Arundo donax*
Japanese barberry *Berberis thunbergii*
Balloon vine *Cardiospermum halicacabum*
Musk thistle *Carduus nutans*
Sickle pod *Cassia obtusifolia*
Brown knapweed *Centaurea jacea*
Bull-thistle *Cirsium vulgare*
Field-bindweed *Convolvulus arvensis*
Cut-leaf teasel *Dipsacus laciniatus*
Common teasel *Dipsacus sylvestris*
Brazilian water-weed *Egeria densa*
Wintercreeper *Euonymus fortunei*
Tall fescue *Festuca elatior (F. pratensis)*
Fennel *Foeniculum vulgare*
Gill-over-the-ground *Glechoma hederacea*
English ivy *Hedera helix*
Velvet-grass *Holcus lanatus*
Japanese hops *Humulus japonicus*
Ivy-leaved morning-glory *glorIpomoea hederacea*
Common morning-glory *Ipomoea purpurea*
Yellow flag Iris *pseudacorus*
Shrubby bushclover *Lespedeza bicolor*
Blunt-leaved privet *Ligustrum obtusifolium*
Amur honeysuckle *Lonicera maackii*
Tartarian honeysuckle *Lonicera tatarica*
Moneywort *Lysimachia nummularia*
China-berry *Melia azedarach*
Princess tree *Paulownia tomentosa*
Timothy *Phleum pratense*
Golden bamboo *Phyllostachys aurea*
Canada bluegrass *Poa compressa*
Rough bluegrass *Poa trivialis*
Bristled knotweed *Polygonum cespitosum*
White poplar *Populus alba*
Jointed charlock *Raphanus raphanistrum*
Red sorrel *Rumex acetosella*
Curled dock *Rumex crispus*
Giant foxtail *Setaria faberi*
Japanese spiraea *Spiraea japonica*
Common chickweed *Stellaria media*
Ivy-leaved speedwell *Veronica herderifolia*
Chinese wisteria *Wisteria sinensis*
Common cocklebur *Xanthium strumarium*

Occasionally Invasive Species

Redtop *Agrostis gigantea*
Bugleweed *Ajuga reptans*
Mimosa *Albizia julibrissin*
Oatgrass *Arrhenatherum elatius*
Common dayflower *Commelina communis*
Poison hemlock *Conium maculatum*
Crown-vetch *Coronilla varia*
Orchard grass *Dactylis glomerata*
Russian olive *Elaeagnus angustifolia*
Thorny elaeagnus *Elaeagnus pungens*
Weeping lovegrass *Eragrostis curvula*
Leafy spurge *Euphorbia esula*
Red morning-glory *Ipomoea coccinea*
Nipplewort *Lapsana communis*
Sweet breath of spring *Lonicera fragrantissima*
Bell's honeysuckle *Lonicera x bella*
Birdsfoot trefoil *Lotus corniculatus*
Silver grass *Miscanthus sinensis*
White mulberry *Morus alba*
Wild parsnip *Pastinaca sativa*
Beefsteak plant *Perilla frutescens*
Black pine *Pinus thunbergii*
Sawtooth oak *Quercus acutissima*
Water chestnut *Trapa natans*
Siberian elm *Ulmus pumila*
Linden viburnum *Viburnum dilatatum*
Periwinkle *Vinca minor & V. major*
Japanese wisteria *Wisteria floribunda*

List of Nurseries for Native Plants from the Virginia Native Plant Society

(Compiled by Nancy Arrington, former Horticulture Chair, Virginia Native Plant Society.)

The following is a list of nurseries whose stock is partially or entirely made up of native plants. It is not intended to be exclusive. There may be other nurseries stocking native plants as well. This is a list of suppliers and is not to be construed as an endorsement of those suppliers.

Lists of plants suggested for conservation, restoration and landscaping in Virginia and lots of other relevant information can be found at care of Virginia's Natural Heritage Program. http://www.dcr.state.va.us/dnh/

(Nursery list from Riparian Buffers Guidance Manual Chesapeake Bay Local Assistance Department)

Botanique
387 Pitcher Plant Ln.
Stanardsville, Va. 22973
E-mail: botanique@pitcherplant.com

Edible Landscaping
361 Spirit Ridge Lane
Afton, Va. 22920
434-361-9134

Meadowview Biological Research Station
8390 Fredericksburg Turnpike
Woodford, Va. 22580
phone/fax: (804) 633-4336 / (804) 633-5056
E-mail: meadowview@pitcherplant.org

The Salt and The Earth
P.O. Box 560
Deltaville, Va. 23043
)804) 776-6985, (804) 776-6324
E-mail: alor@inna.net

Sassafras Farm
7029 Bray Rd.
Hayes, Va. 23072
(804) 642-0923
E-mail: sasafras@3bubbas.com

Virginia Natives
P.O. Box D
Hume, Va. 22639-0903
phone/fax: (540) 364-1665
E-mail: vanatvs@erols.com

Bobtown Nursery
16212 Country Club Rd.
Melfa Va. 23410
(757) 787-8484

Pinelands Nursery
8877 Richmond Rd.
Toano, Va. 23168
(800) 667-2729
sales@pinelandsnursery.com
www.pinelandsnursery.com

Joseph Brown Native Seeds & Plants
7327 Hoefork Lane
Gloucester Point Va. 23062
(804) 642-0736

WaterWays Nursery
Sally Kurtz
13015 Milltown Road
Lovettsville, Va. 20180
(540) 822-5994
http://members.aol.com/wwnursery/index.html

Bibliography and References

Riparian Buffers Guidance Manual Chesapeake Bay Local Assistance Department
Native Plants For Wildlife Habitat U. S. Fish and Wildlife Service Chesapeake Bay Office in Cooperation with Irvine Natural Science Center and Adkins Arboretum
Gilchrist, Drew *Native Trees and Shrubs and Their Wildlife Users* Natual Land Trust
Native Plants For Conservation, Restoration & Landscaping Virginia Department of Conservation and Recreation
Chesterfield Native Landscapes Friends of Chesterfields Riverfront and Virginia Department of Forestry
United States Department of Agriculture Fire Effects Information Web Page
Plant Fact Sheets North Carolina Cooperative Extension Office
University of Connecticut Plant Data Base
MGB Kemper Center For Home Gardening Plant Finder - http://www.mobot.org/gardeninghelp/plantfinder/service.shtml